

IVS Chair's Report

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The years 2021 and 2022 were rather special for the IVS. During 2021, the Covid-19 pandemic slowly faded out, and life returned more or less to normal in most countries. People began going back to their work places instead of working from home, and even international travel became slowly possible again. But the lessons that the IVS components learned during the pandemic, e.g. on how to operate VLBI stations and correlators remotely, are very valuable. The routines adopted, e.g. automated and unattended operations of VLBI stations, will also be of importance and will to some extent continue to be part of the everyday IVS operations in non-pandemic times.

Even though the pandemic slowly faded out during 2021 and 2022, most IVS meetings still were held virtually or in hybrid form. In March 2021, the 24th EVGA working meeting was held completely virtually. The same was true for the 11th IVS Technical Operations Workshop, held in May 2021. In October, the 2nd EU-VGOS workshop was held in hybrid form, with participants both on site in Vienna, Austria, and online. Also the initial plans were that the 2022 12th IVS GM could be held as a hybrid event with on-site participation in Helsinki, Finland, and online participation. But this became impossible, and it had to be changed completely to a virtual meeting in Cyberspace. The IVS VLBI Training school organized in connection with the 12th IVS GM was also held as an online event.

The Russian war of aggression against Ukraine began in February 2022 and caused a significant disruption

and change in the IVS operations. Because some countries do not allow research collaboration with Russia anymore, some VLBI stations no longer co-observe with Russian VLBI stations. These co-observing rules led to corresponding changes in the IVS Master Schedule that will continue until further notice.

The IVS Combination Center submitted the final IVS combined solution for the ITRF2020 combination. In total, 11 IVS Analysis Centers submitted individual solutions to the IVS Combination Center. Seven different VLBI software packages were used for these 11 contributions, see Figure 1.

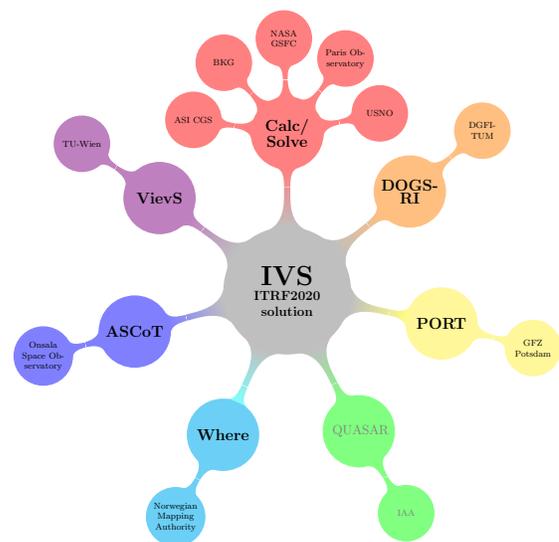


Fig. 1 Submissions to the IVS combined solution for the ITRF2020 combination, with analysis software used and names of the IVS Analysis Centers.

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The evaluation of the new ITRF2020 showed that the SLR and VLBI scales are within 0.5 ppb for the period 1993.0–2013.75. But it was detected that the VLBI scale drifts away after 2013.75, a phenomenon that has not been completely understood and explained yet. A task force on the IVS scale drift, led by the IVS Analysis Coordinator John Gipson, was established to investigate the phenomenon.

VGOS evolved further during 2021–2022. In 2021 the VGOS operational series (VO) was observed every second week. Up to nine VGOS stations were involved: GGAO12M (Gs), ISHIOKA (Is), KOKEE12M (K2), MACGO12M (Mg), ONSA13NE (Oe), ONSA13SW (Ow), WESTFORD (Wf), RAE-GYEB (Yj), and WETTZ13S (Ws). In late 2021 the IVS accepted a proposal by BKG to establish an IVS correlator at the Geodetic Observatory Wettzell. With a new correlator, the expectations were to ramp up the VGOS observations. Starting in January 2022, the cadence of the VO series was thus changed to weekly observations. This worked fine in the beginning, but over time a backlog of VO sessions still accumulated at the correlators. The turnaround time for VO sessions became so long that stations did not get feedback anymore in a reasonable time. Thus, in November 2022 the OPC decided to change back to observing every second week in order to reduce the backlog. It is envisaged that this will be achieved soon and that the VO cadence can be changed again to weekly observations in the second half of 2023. Additionally, new stations joined the VO sessions in 2022. Both HOBART12m (Hb) in Australia and NYALE13N (Nn) on Svalbard joined VO sessions for the first time, and with success.

Several VGOS Research & Development (VR) sessions were observed in 2021 and 2022. These sessions are meant to test different technical and observational aspects in order to develop VGOS further.

Several VGOS Intensive series were also started in 2022, such as the VGOS-INT-S, VGOS-INT-G, and VGOS-INT-Y, additional to the already existing VGOS-INT-A/B/C. Also in 2022, a S/X legacy IVS-INT-00 was started, observing over midnight UT.

In general, the experience is that VGOS sessions are outperforming legacy S/X VLBI sessions concerning station position repeatability and baseline repeatability, as well as UT1-UTC precision and accuracy. But, primarily due to the limited geographic distribution of the station network, VGOS sessions perform

below legacy S/X VLBI sessions for polar motion and nutation.

A topic of increasing importance and concern is the frequency selection for VGOS. During the last two years, the IVS has experienced more and more disturbances at VLBI stations that are caused by an increased utilization of the radio spectrum by active services, both ground-based and space-based. This development is extremely worrying for the future use and operation of VGOS. The IVS was therefore active in giving input to the resolution “in support of the protection of geodetic radio astronomy against radio frequency interference” in 2021, presented to the IAU General Assembly 2022; in writing a support letter in 2021 for a “New IAU Center for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference”, and in writing a support letter in 2022 for a proposed focus meeting on “The future of radio astronomy in an increasingly crowded spectrum” at the IAU General Assembly 2024.

One of our IVS network stations, Santa Maria, even had to face the establishment of a strong radar in close vicinity to the station in 2022. This radar saturates the Santa Maria VGOS receiver and makes it impossible for the station to observe the whole VGOS frequencies currently used in the VO series. It is unfortunately unclear how this problem can be solved at this time.

In the summer of 2022 the Auckland University of Technology decided to disinvest in the Warkworth Radio Astronomical Observatory, one of the important IVS stations in the southern hemisphere. Due to this development and the uncertainty involved, the IVS Network Coordinator, Stuart Weston from Warkworth Observatory, decided to resign from his duties for the IVS. I would like to thank Stuart very much for his service in this function during the past 2.5 years. The IVS sent a letter of protest to Auckland University of Technology and asked for the development of solutions to keep the observatory operational. Luckily it seems now that a solution could be found to keep the observatory alive and operational through moving the responsibility to a New Zealand ministry.

None of the IVS DB meetings during 2021 and 2022 could be held in person. All were online meetings. So I am looking forward to in-person meetings again in 2023. The next IVS DB meeting will be in connection to the EVGA 2023 working meeting, in combination with an IVS Retreat.